

ACOUSTICAL ANALYSIS REPORT

**Theaker Subdivision
Hanson Lane and Ashley Road
Ramona, California 92065**

**Tentative Tract Map
TM5257RPL4
ER 01-09-019**

Prepared For

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1.0 EXECUTIVE SUMMARY

The proposed project consists of the subdivision of one parcel into 8 separate lots for single-family residential development. The project site is located at the northeastern corner of Hanson Lane and Ashley Road in the Community of Ramona, County of San Diego, California. Currently the project site is vacant.

The primary noise sources in the vicinity of the project site include automobile and truck traffic noise from Hanson Lane and Ashley Road. Aircraft over-flight noise associated with the Ramona Airport has been evaluated and is considered insignificant at the project site. The current calculated on-site traffic noise level at the southwestern corner of the project site is 56.3 Community Noise Equivalent Level (CNEL). The future (year 2030) on-site traffic noise level is expected to reach 68.3 CNEL at the same location.

Without mitigation, future exterior noise levels at the outdoor use areas of Lots 1 through 8 will range from 53.0 CNEL at Lot 5 to 64.1 CNEL at Lot 1. Mitigation to provide an exterior noise level below 60 CNEL, in compliance with the County of San Diego standards, and areas of the lots below 55 CNEL as required by the Community of Ramona, will be necessary. This mitigation shall consist of a 605-foot long, 6-foot high sound attenuation barrier along the western property line, adjacent to Ashley Road, and a 260-foot long, 6-foot high sound attenuation barrier along the southern property line, adjacent to Hanson Road, and a 290-foot long, 6-foot high sound attenuation barrier along the southern property line, adjacent to Hanson Road, and a 95-foot long, 6-foot high sound attenuation barrier along the eastern property line. The height of these barriers is given in relation to the elevation of the finished grade elevation. With the sound attenuation barrier recommendation, outdoor use areas on all lots will be below 60 CNEL from traffic noise, in compliance with the County of San Diego limits. Further, all lots will have significant areas below 55 CNEL in compliance with the Community of Ramona specific plan requirements.

The State of California and County of San Diego noise regulations require interior noise levels in habitable residential space to be at or below 45 CNEL. Typical residential construction generally achieves at least 15 dB of noise attenuation in rooms, even with windows open. With the recommended sound attenuation barrier in place, future noise level impacts will be less than 60 CNEL at all of the proposed first and second level building facades. Therefore, an exterior-to-interior noise analysis is not necessary. The project will comply with the 45 CNEL State and County Code requirements for interior noise levels within proposed habitable residential spaces, with windows open. Therefore, it is recommended that no future interior mitigation analysis is required for this project as a result of this acoustical study.

The County guideline regarding noise generated by project-related traffic states that in urbanized residential areas with an existing traffic noise level of 60 CNEL or less, an increase to greater than 60 CNEL due to project-related traffic is considered significant. For areas with an existing traffic noise above 60 CNEL, an increase of 3 dB or more due to project-related traffic is considered significant. Calculations show a maximum traffic noise increase of 1.6 dB for existing plus project generated plus cumulative traffic. These increases to overall vehicle traffic noise to the surrounding area are less than 3 dB, and are therefore considered an insignificant impact.

2.0 INTRODUCTION

This acoustical analysis report is submitted to satisfy the acoustical requirements for tentative tract map approval. Its purpose is to assess noise impacts from nearby roadway traffic, and to identify project features or requirements necessary to achieve exterior noise levels of 55 CNEL or less at outdoor usable areas, and to identify potentially significant noise impacts from project-related traffic, in compliance with the County of San Diego and Community of Ramona noise regulations. Feasibility of interior mitigation will also be addressed.

The County guideline regarding noise generated by project-related traffic states that in urbanized residential areas with an existing traffic noise level of 60 CNEL or less, an increase to greater than 60 CNEL due to project-related traffic is considered significant. For areas with an existing traffic noise above 60 CNEL, an increase of 3 dB or more due to project-related traffic is considered significant.

All noise level or sound level values presented herein are expressed in terms of decibels, with A-weighting to approximate the hearing sensitivity of humans. Time-averaged noise levels are expressed by the symbol L_{EQ} , for a specified duration. The CNEL is a 24-hour average, where sound levels during evening hours of 7:00 p.m. to 10:00 p.m. have an added 5 dB weighting, and sound levels during nighttime hours of 10:00 p.m. to 7:00 a.m. have an added 10 dB weighting. This is similar to the Day-Night sound level, L_{DN} , which is a 24-hour average with an added 10 dB weighting on the same nighttime hours but no added weighting on the evening hours. Sound levels expressed in CNEL are always based on A-weighted decibels. These metrics are used to express noise levels for both measurement and municipal regulations, for land use guidelines, and for enforcement of noise ordinances. Further explanation can be provided upon request.

2.1 Project Location

The project site is located at the northeastern corner of Hanson Lane and Ashley Road in the Community of Ramona, County of San Diego, California. The Assessor's Parcel Number (APN) for the property is 284-032-17-00. The overall property is rectangular in shape with an overall site area of approximately 9.3 acres.

The subject site is currently zoned for residential use. Neighboring land use is primarily residential. Future land use for the subject property is residential. The project location is shown on the Thomas Guide Map, Figure 1, following this report. An Assessor's Parcel Map, Satellite Aerial Photograph, Topographic Map, and Planned Land Use Map of this area are also provided as Figures 2 through 5.

2.2 Project Description

The proposed project consists of the construction of an 8-lot residential subdivision to be located at the northeastern corner of Hanson Lane and Ashley Road in the Community of Ramona, County of San Diego, California. Currently the project site is vacant.

3.0 ENVIRONMENTAL SETTING

3.1 Existing Noise Environment

The primary noise sources in the vicinity of the project site include automobile and truck traffic noise from Hanson Lane and Ashley Road. Noise associated with aircraft over flight operations from the Ramona Airport is insignificant as the project site is approximately 3 miles east of the airport and located outside of the 65 CNEL airport noise contour. Please refer to Figure 6: Ramona Airport Noise Contours. No other noise source is considered significant. All roadway classification information is obtained from the San Diego Association of Governments (SanDAG) Transportation Forecast Center.

Hanson Lane, designated SA 320 in the Circulation Element, is a two-lane, two-way collector roadway running east-west. The paved roadway width is approximately 40 feet. The posted speed limit is 45 mph. The actual speed of vehicles traveling on Hanson Lane in the vicinity of the project site is estimated to be 25-mph. Parallel parking is permitted on both sides of the street. Hanson Lane, in the vicinity of the project site, currently carries a traffic volume of approximately 3,000 ADT, according to the SanDAG Traffic Forecast Information Center.

Ashley Road, designated SC 900 in the Circulation Element, is a two-lane, two-way rural collector roadway running north-south. The paved roadway width is approximately 25 feet. The posted speed limit is 45 mph. The actual speed of vehicles traveling on Ashley Road in the vicinity of the project site is estimated to be 25 mph. Parallel parking is not permitted on both sides of the street. Ashley Road, in the vicinity of the project site, currently carries a traffic volume of approximately 2,000 ADT, according to the SanDAG Traffic Forecast Information Center.

The current calculated on-site traffic noise level at the southwestern corner of the project site is 56.3 CNEL. Current and future traffic volumes for the roadway sections near the project site are shown below in Table 1. For further roadway details and projected future ADT traffic volumes, please refer to Appendix A: Sound32 Data and Results.

Table 1. Current Traffic Information		
Roadway Name	Speed Limit (mph)	Current ADT
	Current	
Hanson Lane Eastbound	45	1,500
Hanson Lane Westbound	45	1,500
Ashley Road Northbound	45	1,000
Ashley Road Southbound	45	1,000

Current truck percentages were obtained from the Materials Laboratory Traffic Indices (DPW, 10/2004), according to Nick Ortiz, Associate Transportation Specialist for the County of San Diego Public Works

Department, Francisco.ortiz@sdcounty.ca.gov. A truck percentage mix of 3.99% medium and 0.62% heavy trucks was used for Hanson Lane and a truck percentage mix of 8.67% medium and 1.87% heavy trucks was used for Ashley Road.

3.1.1 Measured Noise Level

An on-site inspection and traffic noise measurement were made on the afternoon of Wednesday, December 15, 2004. The weather conditions were as follows: clear skies, low humidity, temperatures in the low 70's with calm winds from the west. A "one-hour" equivalent measurement was made near the project property line at the northeastern corner of Hanson Lane and Ashley Road. The microphone position was approximately five feet above the existing project site grade and approximately five feet from the curb. Traffic volumes were recorded for automobiles, medium-size trucks, and large trucks during the measurement period. After a continuous 15-minute sound level measurement, there was no change in the L_{EQ} and results were then recorded. The measured noise level and related weather conditions are found below in Table 2. The calculated equivalent hourly vehicle traffic count adjustment and a complete tabular listing of all traffic data recorded during the on-site traffic noise measurement are found in Appendix A: Sound32 Data and Results.

Table 2. On-Site Noise Measurement Conditions and Results	
Date	Wednesday, December 15, 2004
Time	3:30 p.m. - 3:45 p.m.
Conditions	Clear Skies, Winds from the West @ 4-6 mph, Temperature Low 70's with Low Humidity
Measured Noise Level	62.3 dBA L_{EQ}

3.1.2 Calculated Noise Level

Noise levels were calculated for the site using the methodology described in Section 4.1 (see next page) for the location, conditions, and traffic volumes counted during the noise measurements. The calculated noise levels (L_{EQ}) were compared with the measured on-site noise level to determine if adjustments or corrections (calibration) should be applied to the traffic noise prediction model, Sound32. Adjustments are intended to account for site-specific differences, such as reflection and absorption, which may be greater or lesser than accounted for in the model.

The measured noise level of 62.3 dBA L_{EQ} for Hanson Lane and Ashley Road was compared to the calculated (modeled) noise level of 62.5 dBA L_{EQ} , for the same conditions and traffic flow. As there was only a 0.2 dBA difference between the measured and the calculated noise level, no adjustment was deemed necessary to model future noise levels for this location. Please refer to Table 3, below.

Table 3. Calculated versus Measured Traffic Noise Data				
Roadways	Calculated	Measured	Difference	Correction
Hanson Lane and Ashley Road	62.5 dBA L_{EQ}	62.3 dBA L_{EQ}	0.2 dB	none

3.2 Future Noise Environment

The future (Year 2030) traffic volumes for Hanson Lane and Ashley Road were provided by the SanDAG Transportation Forecast Information Center. The future (Year 2030) traffic volumes for Hanson Lane are projected to be 7,000 ADT. The future (Year 2030) traffic volumes for Ashley Road are projected to be 3,000 ADT. The future (Year 2030) traffic noise level at the southwestern corner of the project site is expected to increase to 68.3 CNEL if the roadway is realigned to allow high speed traffic.

The same truck percentages from the existing traffic volumes were used for future traffic volume modeling. According to Nick Ortiz, the roadway classification for Hanson Lane is proposed to be changed to a 4-lane Collector roadway with a design speed of 55 mph. The design speed for Ashley Road is proposed to be changed to 40 mph. A speed limit of 50 mph was used for future traffic modeling of Hanson Lane due to the stop sign at the intersection of Ashley Road and because of the private residence access to Hanson Lane. A speed limit of 40 mph was used for future traffic modeling of Ashley Road. The roadway alignment and roadbed are expected to remain the same for these sections of Ashley Road. For further roadway details and projected future ADT traffic volumes, please refer to Appendix A: Sound32 Data and Results.

The proposed roadway realignments have been opposed by the Ramona Planning group (see Appendix B, November 10, 2005 Ramona Sentinel newspaper article) and are unlikely to be implanted by the year 2030. Because these realignments will probably not be completed by the year 2030 exterior mitigation planning for the current project will be based on the more likely scenario of lower speeds which are required by current roadway conditions. Additional information will be provided for planning purposes of what mitigation will be required if the roads are realigned. Further, exterior-to-interior analysis will be based on the elevated noise levels from faster traffic (50 mph).

Table 4. Future Traffic Information		
Roadway Name	Speed Limit (mph)	Future (2030) ADT
	Future	
Hanson Lane Eastbound	50	6,000
Hanson Lane Westbound	50	7,000
Ashley Road Northbound	45	4,000
Ashley Road Southbound	45	2,000

Table 5. Future Traffic Conditions					
Roadway	Hourly Percentage	Total %	Autos	Medium	Heavy
		ADT	(Hourly)	(Hourly)	(Hourly)
Hanson Lane Eastbound	5.80%	100.00%	95.39%	3.99%	0.62%
		6,000	332	14	2
Hanson Lane Westbound	5.80%	100.00%	95.39%	3.99%	0.62%
		7,000	387	16	3
Ashley Road Northbound	5.80%	100.00%	89.46%	8.67%	1.87%
		4,000	208	20	4
Ashley Road Southbound	5.80%	100.00%	89.46%	8.67%	1.87%
		2,000	104	10	2

4.0 METHODOLOGY AND EQUIPMENT

4.1 Methodology

4.1.1 Field Measurement

Typically, a “one-hour” equivalent sound level measurement (L_{EQ} , A-Weighted) is recorded for at least one noise-sensitive location on the site. During the on-site noise measurement, start and end times are recorded, vehicle counts are made for cars, medium trucks (double-tires/two axles), and heavy trucks (three or more axles) for the corresponding road segment(s). Supplemental sound measurements of one hour or less in duration are often made to further describe the noise environment of the site.

For measurements of less than one hour in duration, the measurement time is long enough for a representative traffic volume to occur and the noise level (L_{EQ}) to stabilize; 15 minutes is usually sufficient for this purpose. The vehicle counts are then converted to one-hour equivalent volumes by using the appropriate multiplier.

Other field data gathered includes measuring or estimating distances, angles-of-view, slopes, elevations, roadway grades, and vehicle speeds. This data was checked against the available maps and records.

4.1.2 Roadway Noise Calculation

The Sound32 Release 1.41 program released by the California Department of Transportation, Division of New Technology, Materials and Research was used to calculate the future daytime average hourly noise level (HNL) at various locations at the project site. The daytime average hourly traffic volume is calculated as 0.058 times the ADT, based on the studies made by Wyle Laboratories (see reference). The HNL is equivalent to the L_{EQ} , and both are converted to the CNEL by adding 2.0 decibels, as shown in the Wyle Study. Future CNEL is calculated for desired receptor locations using future road alignment, elevations, lane configurations, projected traffic volumes, estimated truck mixes, and vehicle speeds. Noise attenuation methods may be analyzed, tested, and planned with Sound32, as required. Further explanation can be supplied on request.

4.2 Measurement Equipment

Some or all of the following equipment was used at the site to measure existing noise levels:

- Larson Davis Model 820 Integrating Sound Level Meter, Type 1, Serial # 0316
- Larson Davis Model CA200 Calibrator, Serial # 0292
- Hand-bearing magnetic compass, microphone with windscreen, tripods
- Distance measurement wheel, digital camera

The sound level meter was field-calibrated immediately prior to the noise measurement and checked afterward, to ensure accuracy. All sound level measurements conducted and presented in this report, in accordance with the regulations, were made with a sound level meter that conforms to the American National Standards Institute specifications for sound level meters ANSI S1.4-1983 (R2001). All instruments are maintained with National Bureau of Standards traceable calibration, per the manufacturer's standards.

5.0 IMPACTS AND MITIGATION

5.1 Exterior

The exterior noise impacts at the project site are primarily the result of automobile and truck traffic traveling on Hanson Lane and Ashley Road. Without mitigation or proposed project structures, the future-70 CNEL contour will be located approximately 50 feet north of the Hanson Lane centerline, extending from east to west. The future 65 CNEL contour will be located approximately 75 feet north of the Hanson Lane centerline at the southern portion of the project site, extending from east to west, and approximately 45 feet east of the Ashley Road centerline at the western portion of the project site, extending from north to south. The future 60 CNEL contour will be located approximately 160 feet north of the Hanson Lane centerline at the southern portion of the project site, extending from east to west, and approximately 80 feet east of the Ashley Road centerline at the western portion of the project site, extending from north to south. For a graphical representation of these contours, please refer to Figure 7: Site Plan Showing Future Traffic CNEL Contours and Noise Measurement Location, and Table 6.

Without mitigation, future exterior noise levels at the outdoor use areas of Lots 1 through 8 will range from 46.3 CNEL at Lot 5 to 57.9 CNEL at Lot 1 close to the intersection. Mitigation to provide an exterior noise level below 60 CNEL, the County of San Diego limit for outdoor use areas, will be necessary. This mitigation shall consist of a 605-foot long, 6-foot high sound attenuation barrier along the western property line, adjacent to Ashley Road, and a 260-foot long, 6-foot high sound attenuation barrier along the southern property line, adjacent to Hanson Road, and a 290-foot long, 6-foot high sound attenuation barrier along the southern property line, adjacent to Hanson Road, and a 95-foot long, 6-foot high sound attenuation barrier along the eastern property line. The height of these barriers is given in relation to the elevation of the finished grade elevation. With the sound attenuation barrier recommendation, outdoor use areas on all lots will be below 60 CNEL from traffic noise, in compliance with the County of San Diego limits. Further, all lots will have significant areas below 55 CNEL in compliance with the Community of Ramona specific plan requirements.

Table 6. Future Traffic Noise With 6 Foot Wall		
Distance From Southwest Property Corner in Feet		
North	East	CNEL
100	100	57.2
100	200	57.4
100	300	56.9
100	400	55.9
100	500	55.6
100	600	56.2
200	100	57.6
200	200	56.0
200	300	54.9
200	400	54.1
200	500	53.6
200	600	53.8
300	100	59.2
300	200	55.8
300	300	54.1
300	400	53.2
300	500	52.6
300	600	52.4
400	100	58.1
400	200	55.4
400	300	53.7
400	400	52.7
400	500	52.0

A future noise contour with barriers map has been provided to show the site noise contours with the 6 foot barrier in place.

5.2 Interior

The State of California and County of San Diego noise regulations require interior noise levels in habitable residential space to be at or below 45 CNEL. Typical residential construction generally achieves at least 15 dB of noise attenuation in rooms, even with windows open. With the recommended sound attenuation barrier in place, future noise level impacts will be less than 60 CNEL at all of the proposed first and second level building facades. Therefore, an exterior-to-interior noise analysis is not necessary. The project will comply with the 45 CNEL State and County Code requirements for interior noise levels within proposed habitable residential spaces, with windows open. Therefore, it is recommended that no future interior mitigation analysis is required for this project as a result of this acoustical study.

5.3 Project Generated Traffic

According to the Traffic Study for the Theaker Subdivision project by Federhart & Associates, dated March 24, 2005, the proposed project will generate additional traffic along Hanson Lane, in the vicinity of the project site. The traffic study provides data for existing traffic, existing plus project generated traffic, and existing plus project generated plus cumulative traffic.

The County guideline regarding noise generated by project-related traffic states that in urbanized residential areas with an existing traffic noise level of 60 CNEL or less, an increase to greater than 60 CNEL due to project-related traffic is considered significant. For areas with an existing traffic noise above 60 CNEL, an increase of 3 dB or more due to project-related traffic is considered significant.

Based upon the existing traffic volumes, the traffic noise impacts to the proposed project are expected to exceed 60 CNEL. Calculations were performed to determine the CNEL increase due to existing plus project generated traffic and existing plus project generated plus cumulative traffic.

These calculations show a maximum traffic noise increase of 1.6 dB for existing plus project generated plus cumulative traffic. These increases to overall vehicle traffic noise to the surrounding area are less than 3 dB, and are therefore considered an insignificant impact. Tables 7 and 8 summarize the CNEL increases for this roadway.

Table 7. Noise Impacts from Existing and Project Generated Traffic			
<u>Roadway</u>	<u>Existing ADT</u>	<u>Existing + Project ADT</u>	<u>CNEL Increase</u>
<u>Hanson Lane</u>	<u>3,700</u>	<u>3,752</u>	<u>0.06 dB</u>

Table 8. Cumulative Noise Impacts from Existing and Project Generated Traffic			
<u>Roadway</u>	<u>Existing ADT</u>	<u>Existing + Project + Cumulative ADT</u>	<u>CNEL Increase</u>
<u>Hanson Lane</u>	<u>3,700</u>	<u>5,352</u>	<u>1.6 dB</u>

6.0 CERTIFICATION

The findings and recommendations of this acoustical analysis report are based on the information available and are a true and factual analysis of the potential acoustical issues associated with the Theaker Subdivision project at Hanson Lane and Ashley Road in the Community of Ramona, County of San Diego, California. This report was prepared by Charles Terry, Michael Burrill, and Douglas K. Eilar.



Charles Terry, Senior Acoustical Engineer

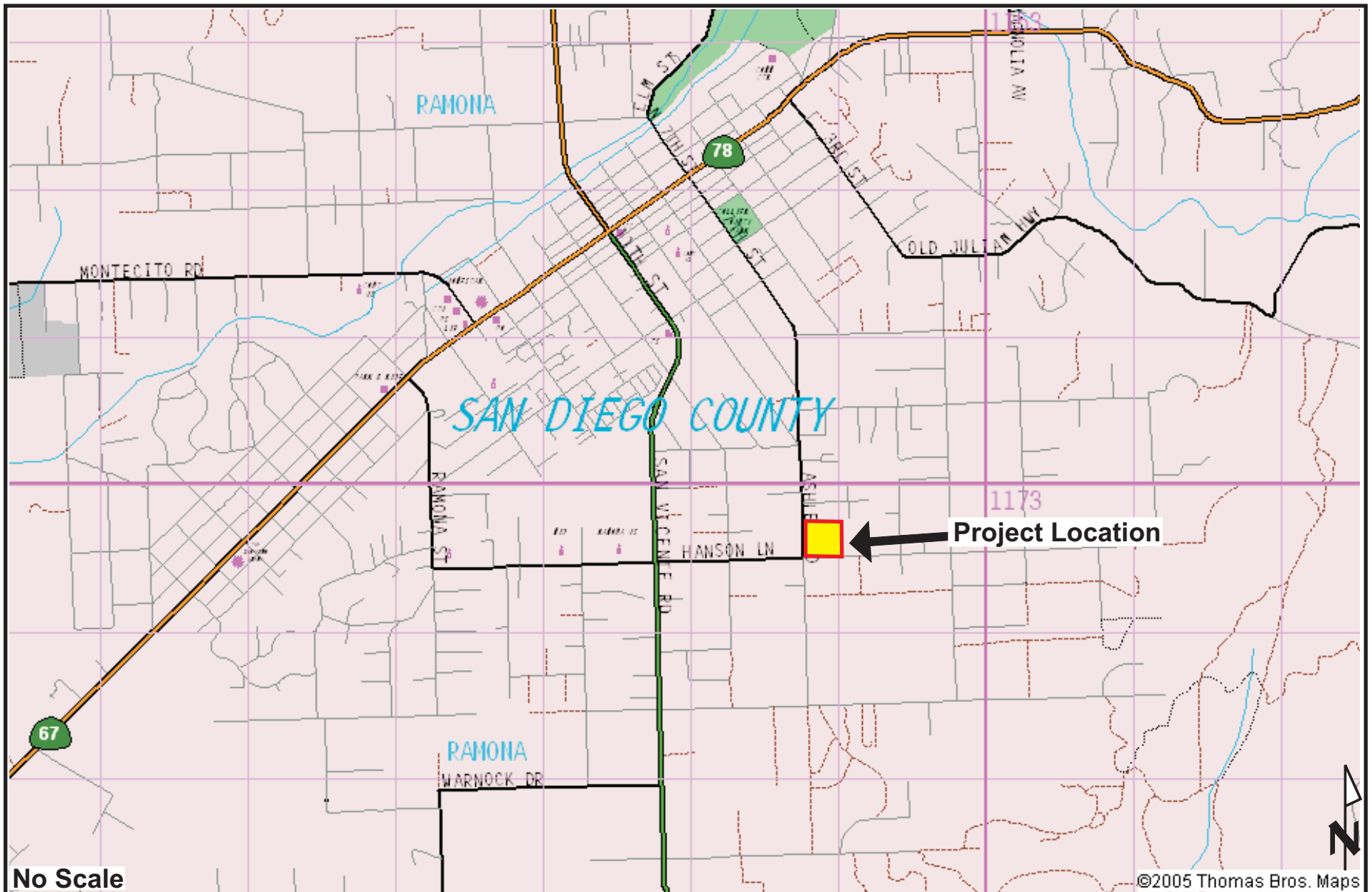


Douglas K. Eilar, Principal

7.0 REFERENCES

1. 2001 California Noise Insulation Standards, effective 11/01/02, Based on 1997 Uniform Building Code, California Code of Regulations, Title 24.
2. California Department of Transportation, Sound32 Traffic Noise Model.
3. County of San Diego Noise Element to the General Plan.
4. Community of Ramona Noise Element to the General Plan.
5. Harris, Cyril M., Handbook of Acoustical Measurements and Noise Control, 3rd Edition, Acoustical Society of America, 1998
6. Heeden, Robert A., Compendium of Materials for Noise Control, U.S. Department of Health, Education and Welfare, National Institute for Occupational Safety and Health, November 1978.
7. Irvine, Leland K., Richards, Roy L., Acoustics and Noise Control Handbook for Architects and Builders, Kreiger Publishing Company, 1998
8. NBS Building Sciences Series 77, Acoustical and Thermal Performance on Exterior Residential Walls, U.S. Department of Commerce/National Bureau of Standards, November 1976.
9. San Diego Association of Governments (SanDAG) Transportation Forecast Information Center, 2005.
10. Western Electro-Acoustic Laboratory, Inc., 1711 Sixteenth Street, Santa Monica, California 90404, 213-80-9268, Sound Transmission Loss Vs. Glazing Type, Window Size and Air Filtration, January 1985. The research described in this report was prepared for the California Association of Window Manufacturers, 823 North Harbor Boulevard, Suite E, Fullerton, California 92632, 714-525-7088.

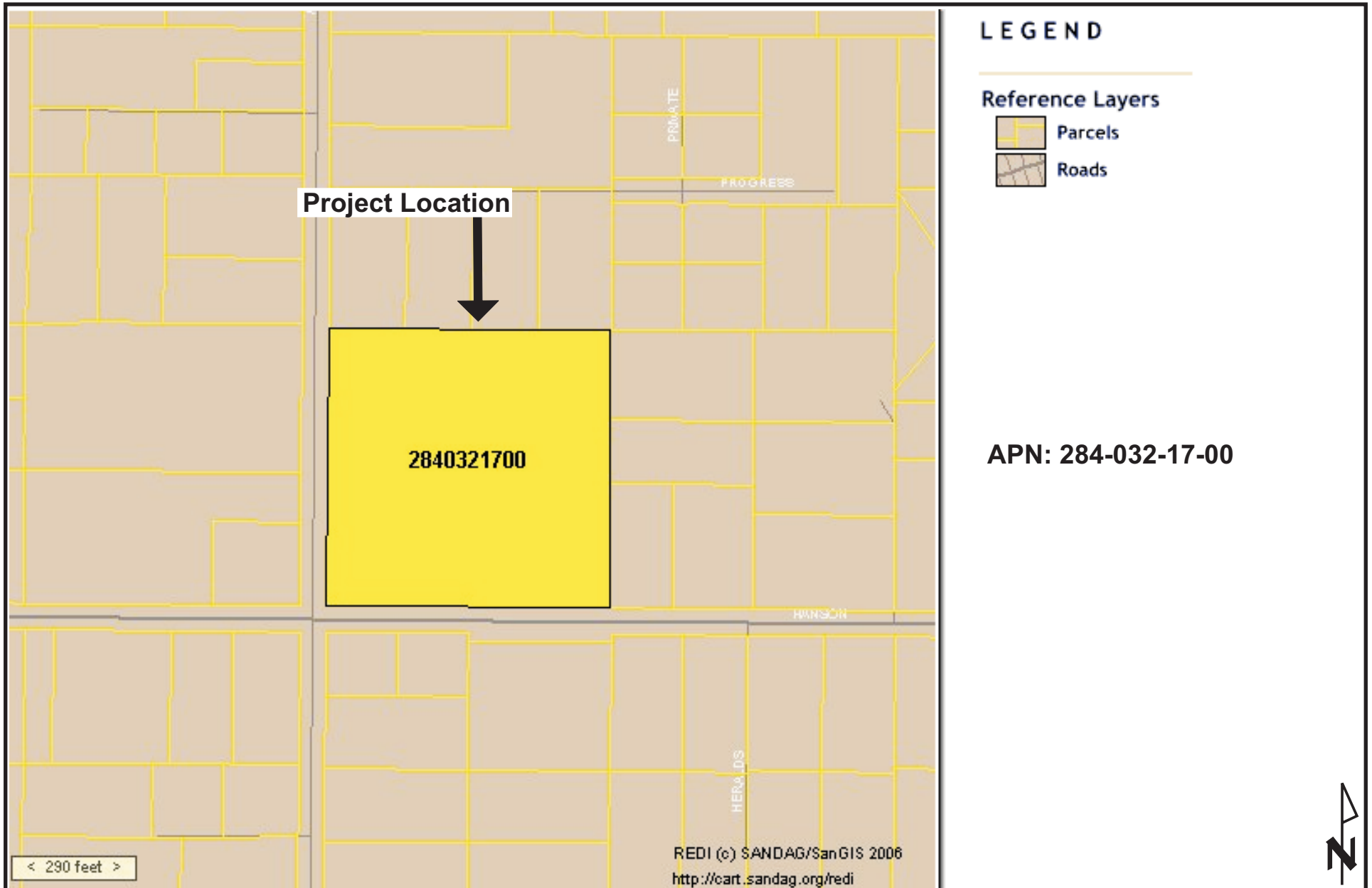
FIGURES



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Thomas Guide Map
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Figure 1



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Assessor's Parcel Map
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Figure 2



Project Location

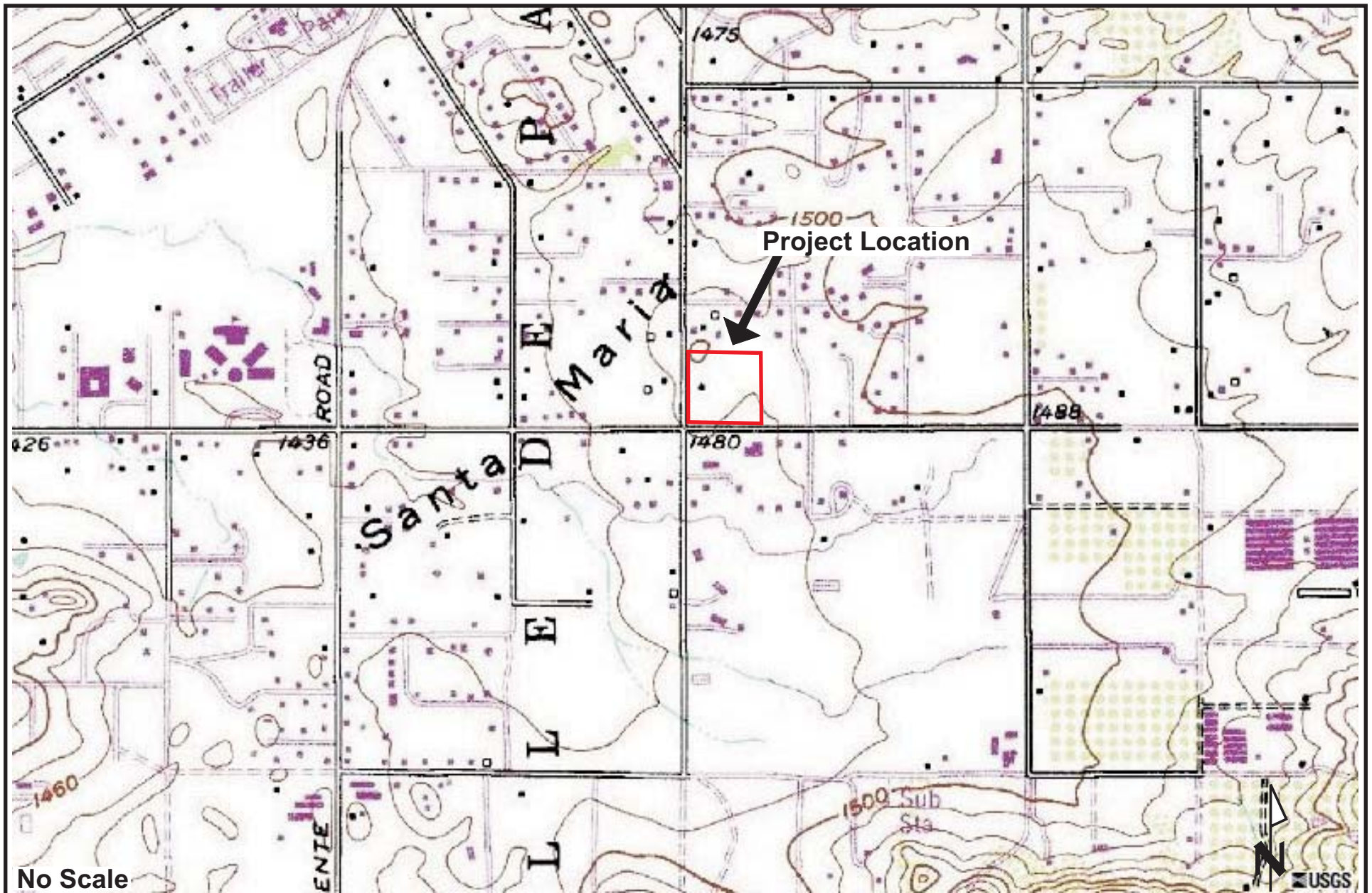
No Scale



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Satellite Aerial Photograph
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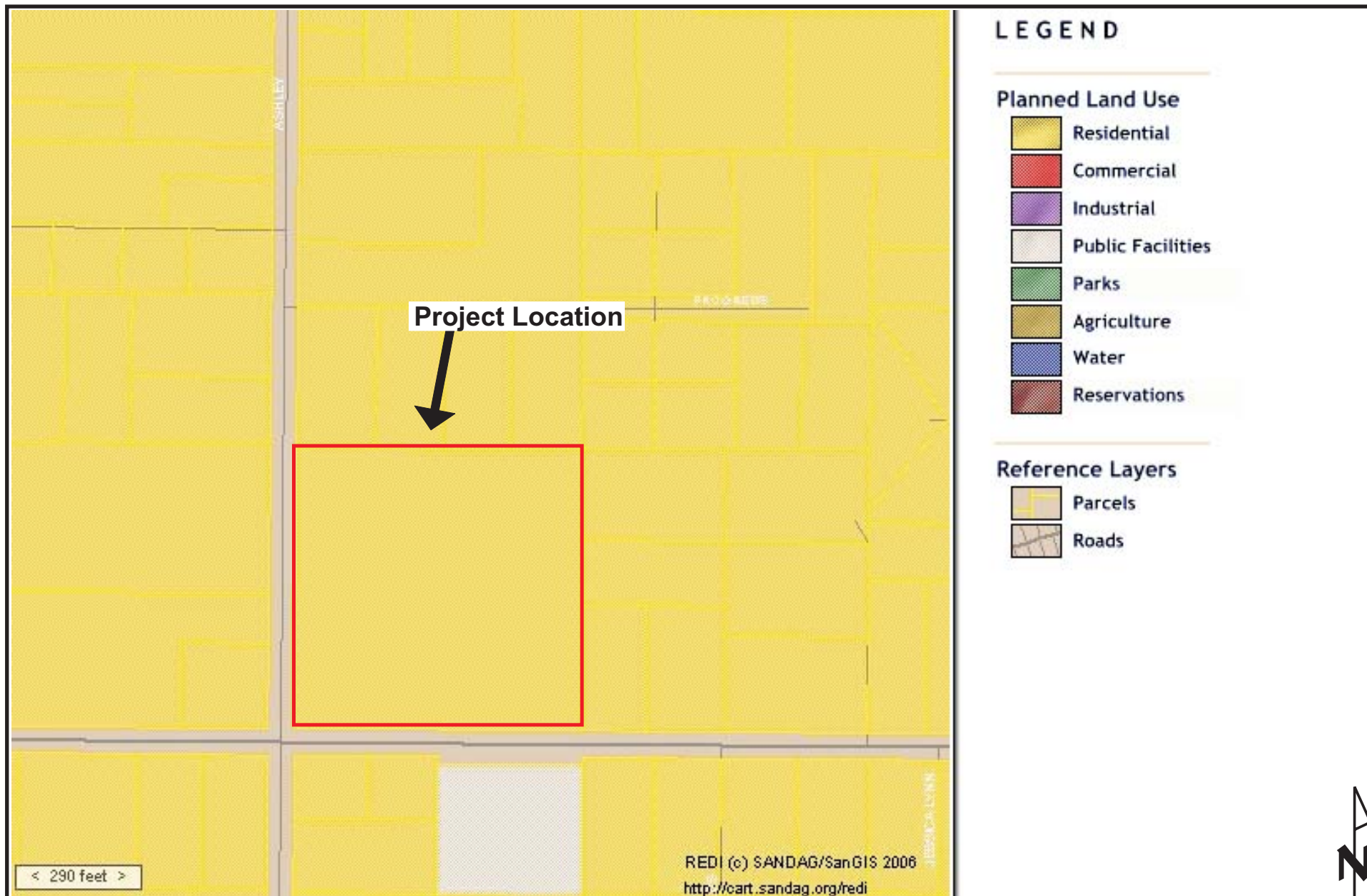
Figure 3



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Topographic Map
Job # A41219N3

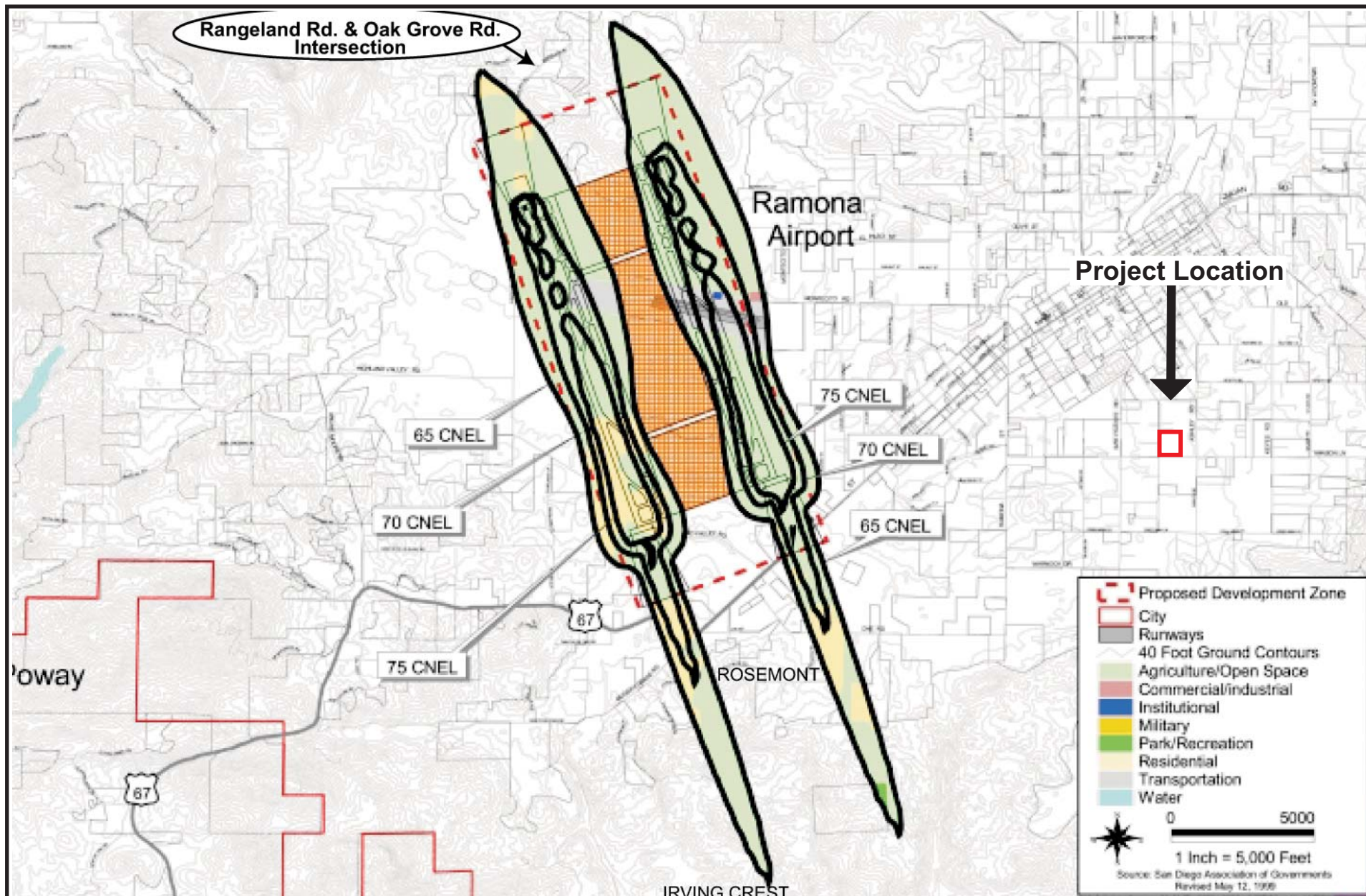
Figure 4



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Planned Land Use
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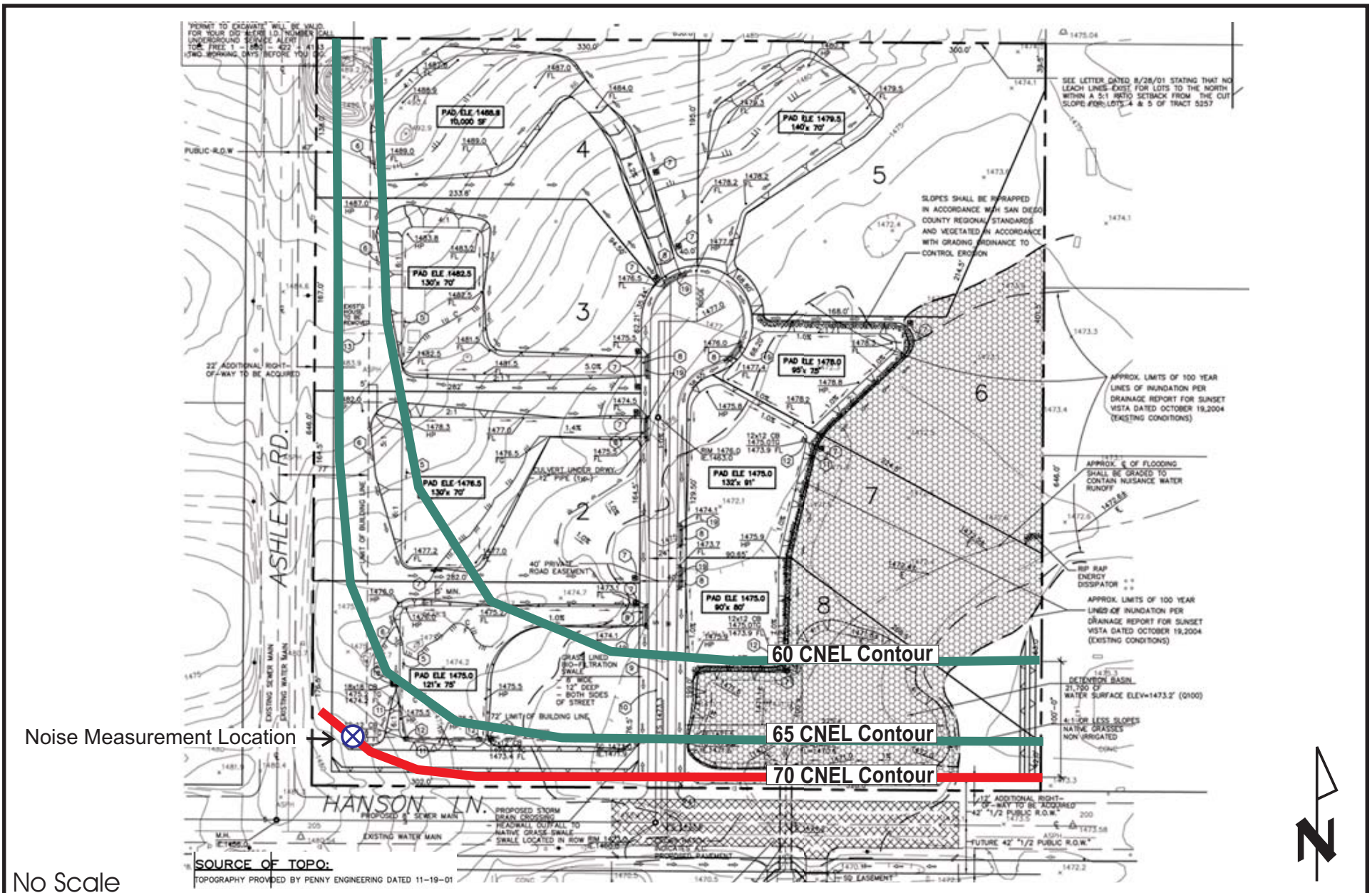
Figure 5



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Ramona Airport Noise Contours
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Figure 6



No Scale

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Site Plan Showing Future Traffic CNEL
and Noise Measurement Location
Job # A41219N3

Figure 7

APPENDIX A

Sound32 Data and Results

Sound 32 Data and Results

Theaker Subdivision

On-Site Noise Measurement Conditions and Results	
Date	Wednesday, December 15, 2004
Time	3:30 p.m. - 3:45 p.m.
Conditions	Clear Skies, Winds from the West @ 2-4 mph, Temperature Mid 70's with Low Humidity
Measured Noise Level	62.3 dBA L _{EQ}

Traffic Count During On-Site Noise Measurement						
Roadway		Duration	Autos	Medium	Heavy	Totals
Hanson Lane Eastbound	Measured	15 Min.	43	3	1	47
	Overall	60 Min.	172	12	4	188
Hanson Lane Westbound	Measured	15 Min.	25	1	1	27
	Overall	60 Min.	100	4	4	108
Ashley Road Northbound	Measured	15 Min.	13	2	1	16
	Overall	60 Min.	52	8	4	64
Ashley Road Southbound	Measured	15 Min.	20	0	0	20
	Overall	60 Min.	80	0	0	80

Noise Level Comparison Using Traffic Model versus On-Site Noise Measurement				
Roadway	Model	Measured	Difference	Correction
Hanson Lane and Ashley Road	62.5 dBA L _{EQ}	62.3 dBA L _{EQ}	0.2 dB	none

Current Traffic Reference Information

- Current traffic ADT's for the roadways were obtained from the San Diego Association of Government (SanDAG) 2000 Traffic Volume Forecast, Series 10, as listed in the Transportation Forecast Information Center on the SanDAG website at <http://www.sandag.com>, according to Ziyang Ouyang, zou@sandag.org.

Future Traffic Reference Information

Future traffic ADT's for the roadways were obtained from the San Diego Association of Government (SanDAG) 2020 Traffic Volume Forecast, Series 10, as listed in the Transportation Forecast Information Center on the SanDAG website at <http://www.sandag.com>, according to Ziyang Ouyang, zou@sandag.org

Current Traffic Information		
Roadway Name	Speed Limit (mph)	Current ADT
	Current	
Hanson Lane Eastbound	45	1,500
Hanson Lane Westbound	45	1,500
Ashley Road Northbound	45	1,000
Ashley Road Southbound	45	1,000

Future Traffic Information		
Roadway Name	Speed Limit (mph)	Future ADT
	Future	
Hanson Lane Eastbound	45	2,000
Hanson Lane Westbound	45	4,000
Ashley Road Northbound	45	3,000
Ashley Road Southbound	45	1,000

Future Traffic Conditions					
Roadway	Hourly Percentage	Total % ADT	Autos (Hourly)	Medium (Hourly)	Heavy (Hourly)
Hanson Lane Eastbound	5.80%	100.00% 6,000	95.39% 332	3.99% 14	0.62% 2
Hanson Lane Westbound	5.80%	100.00% 7,000	95.39% 387	3.99% 16	0.62% 3
Ashley Road Northbound	5.80%	100.00% 4,000	89.46% 208	8.67% 20	1.87% 4
Ashley Road Southbound	5.80%	100.00% 2,000	89.46% 104	8.67% 10	1.87% 2

SOUND32 PROGRAM DATA FOR CALTRANS VERSION OF STAMINA2/OPTIMA

Future Traffic

SOUND32 - RELEASE 07/30/91

TITLE:
Untitled

EFFECTIVENESS / COST RATIOS

BAR

ELE 0 1 2 3 4 5 6 7

1	-	0.*						B1 P1
2	-	0.*						B1 P2
3	-	0.*						B1 P3
4	-	0.*						B1 P4
5	-	0.*						B2 P1
6	-	0.*						B2 P2
7	-	0.*						B2 P3
8	-	0.*						B2 P4
9	-	0.*						B2 P5
10	-	0.*						B2 P6
11	-	0.*						B3 P1
12	-	0.*						B3 P2
13	-	0.*						B3 P3
14	-	0.*						B3 P4
15	-	0.*						B3 P5

0 1 2 3 4 5 6 7

1

BARRIER DATA

BAR										BAR		
ELE	0	1	2	3	4	5	6	7	ID	LENGTH	TYPE	
1	-	6.*							B1 P1	140.1	CONCRET	
2	-	6.*							B1 P2	160.1	CONCRET	
3	-	6.*							B1 P3	163.2	CONCRET	
4	-	6.*							B1 P4	150.1	CONCRET	
5	-	6.*							B2 P1	7.1	CONCRET	
6	-	6.*							B2 P2	57.0	CONCRET	
7	-	6.*							B2 P3	42.0	CONCRET	
8	-	6.*							B2 P4	83.0	CONCRET	
9	-	6.*							B2 P5	65.0	CONCRET	
10	-	6.*							B2 P6	12.8	CONCRET	
11	-	6.*							B3 P1	12.2	CONCRET	
12	-	6.*							B3 P2	210.0	CONCRET	
13	-	6.*							B3 P3	70.0	CONCRET	
14	-	6.*							B3 P4	.0	CONCRET	
15	-	6.*							B3 P5	95.0	CONCRET	

0 1 2 3 4 5 6 7

1

REC REC ID DNL PEOPLE LEQ(CAL)

1	TestLoc	67.	500.	66.1
2	R-2	67.	500.	69.7
3	R-3	67.	500.	66.1
4	R-4	67.	500.	65.7
5	R-5	67.	500.	65.5

6	R-6	67.	500.	65.4
7	R-7	67.	500.	65.3
8	R-8	67.	500.	65.1
9	R-9	67.	500.	68.2
10	R-10	67.	500.	55.2
11	R-11	67.	500.	55.4
12	R-12	67.	500.	54.9
13	R-13	67.	500.	53.9
14	R-14	67.	500.	53.6
15	R-15	67.	500.	54.2
16	R-16	67.	500.	68.1
17	R-17	67.	500.	55.6
18	R-18	67.	500.	54.0
19	R-19	67.	500.	52.9
20	R-20	67.	500.	52.1
21	R-21	67.	500.	51.6
22	R-22	67.	500.	51.8
23	R-23	67.	500.	68.1
24	R-24	67.	500.	57.2
25	R-25	67.	500.	53.8
26	R-26	67.	500.	52.1
27	R-27	67.	500.	51.2
28	R-28	67.	500.	50.6
29	R-29	67.	500.	50.4
30	R-30	67.	500.	68.0
31	R-31	67.	500.	56.1
32	R-32	67.	500.	53.4
33	R-33	67.	500.	51.7
34	R-34	67.	500.	50.7
35	R-35	67.	500.	50.0
36	R-36	67.	500.	68.0
37	R-37	67.	500.	55.9
38	R-38	67.	500.	53.1
39	R-39	67.	500.	67.9
40	R-40	67.	500.	45.6

BARRIER TYPE	COST
BERM	0.
MASONRY	0.
MASONRY/JERSEY	0.
CONCRETE	111051.

TOTAL COST = \$ 111000.

BARRIER HEIGHT INDEX FOR EACH BARRIER SECTION

1 1 1 1 1 1 1 1 1 1 1 1 1 1 1

CORRESPONDING BARRIER HEIGHTS FOR EACH SECTION

6. 6. 6. 6. 6. 6. 6. 6. 6. 6. 6. 6. 6. 6. 6.

** SOUND32 (CALTRANS VERSION OF STAMINA2/OPTIMA) **

INPUT DATA FILE : FWL50M~1.TXT

BARRIER COST FILE : CALIF\$.DTA

DATE : 12-19-2005

Untitled

TRAFFIC DATA

| LANE NO. | AUTO VPH | AUTO MPH | MEDIUM TRKS VPH | MEDIUM TRKS MPH | HEAVY TRKS VPH | HEAVY TRKS MPH | DESCRIPTION |
|----------|----------|----------|-----------------|-----------------|----------------|----------------|-------------|
| 1 | 166 | 50 | 7 | 50 | 1 | 50 | |
| 2 | 166 | 50 | 7 | 50 | 1 | 50 | |
| 3 | 104 | 40 | 10 | 40 | 2 | 40 | |
| 4 | 104 | 40 | 10 | 40 | 2 | 40 | |

LANE DATA

 LANE SEG. GRADE
 NO. NO. COR. X Y Z DESCRIPTION

```

1 1 NO -500.0 -20.0 1466.0 L1 P1
2 NO -37.0 -20.0 1480.0 L1 P2
3 NO -22.0 -20.0 1480.0 L1 P3
800.0 -20.0 1472.0 L1 P4

2 1 NO -500.0 -40.0 1466.0 L2 P1
2 NO -37.0 -40.0 1480.0 L2 P2
3 NO -22.0 -40.0 1480.0 L2 P3
800.0 -40.0 1472.0 L2 P4

3 1 NO -22.0 -200.0 1472.0 L3 P1
2 NO -22.0 -40.0 1480.0 L3 P2
3 NO -22.0 -20.0 1480.0 L3 P3
-22.0 800.0 1494.0 L3 P4

4 1 NO -37.0 -200.0 1472.0 L4 P1
2 NO -37.0 -40.0 1480.0 L4 P2
3 NO -37.0 -20.0 1480.0 L4 P3
-37.0 800.0 1494.0 L4 P4
  
```

=====

BARRIER DATA

Barrier No. 1 Description: 6 ft wall
 Type - (4)CONCRETE
 Height Increment (DELZ)= 0.0 No. Height Changes (P)=0

| SEG. | X | Y | GROUND
(Z0) | TOP
(Z) | BARRIER
HEIGHTS AT ENDS |
|------|------|-------|----------------|------------|----------------------------|
| 1 | 18.0 | 640.0 | 1493.8 | 1499.8 | *B1 P1 * 6 |
| 2 | 18.0 | 500.0 | 1487.5 | 1493.5 | *B1 P2 * 6 |
| 3 | 18.0 | 340.0 | 1483.3 | 1489.3 | *B1 P3 * 6 |
| 4 | 18.0 | 177.0 | 1476.0 | 1482.0 | *B1 P4 * 6 |
| | 18.0 | 27.0 | 1481.3 | 1487.3 | *B1 P5 * 6 |

Barrier No. 2 Description: 5 ft wall
 Type - (4)CONCRETE
 Height Increment (DELZ)= 0.0 No. Height Changes (P)=0

| SEG. | X | Y | GROUND
(Z0) | TOP
(Z) | BARRIER
HEIGHTS AT ENDS |
|------|-------|------|----------------|------------|----------------------------|
| 1 | 18.0 | 27.0 | 1481.3 | 1487.3 | *B2 P1 * 6 |
| 2 | 23.0 | 22.0 | 1481.0 | 1487.0 | *B2 P2 * 6 |
| 3 | 80.0 | 22.0 | 1479.0 | 1485.0 | *B2 P3 * 6 |
| 4 | 122.0 | 22.0 | 1477.0 | 1483.0 | *B2 P4 * 6 |
| 5 | 205.0 | 22.0 | 1475.0 | 1481.0 | *B2 P5 * 6 |
| 6 | 270.0 | 22.0 | 1473.2 | 1479.2 | *B2 P6 * 6 |
| | 280.0 | 30.0 | 1473.2 | 1479.2 | *B2 P7 * 6 |

Barrier No. 3 Description: 5 ft wall2
 Type - (4)CONCRETE
 Height Increment (DELZ)= 0.0 No. Height Changes (P)=0

| SEG. | X | Y | GROUND
(Z0) | TOP
(Z) | BARRIER
HEIGHTS AT ENDS |
|------|-------|-------|----------------|------------|----------------------------|
| 1 | 320.0 | 22.0 | 1473.2 | 1479.2 | *B3 P1 * 6 |
| 2 | 330.0 | 15.0 | 1473.2 | 1479.2 | *B3 P2 * 6 |
| 3 | 540.0 | 15.0 | 1470.0 | 1476.0 | *B3 P3 * 6 |
| 4 | 610.0 | 15.0 | 1471.0 | 1477.0 | *B3 P4 * 6 |
| 5 | 610.0 | 15.0 | 1471.0 | 1477.0 | *B3 P5 * 6 |
| | 610.0 | 110.0 | 1471.0 | 1477.0 | *B3 P6 * 6 |

RECEIVER DATA

REC.

| NO. | X | Y | Z | DNL | PEOPLE | ID |
|-----|-------|-------|--------|-----|--------|---------|
| 1 | 11.0 | 36.0 | 1484.5 | 67 | 500 | TestLoc |
| 2 | 0.0 | 0.0 | 1485.0 | 67 | 500 | R-2 |
| 3 | 0.0 | 100.0 | 1484.0 | 67 | 500 | R-3 |
| 4 | 0.0 | 200.0 | 1484.0 | 67 | 500 | R-4 |
| 5 | 0.0 | 300.0 | 1487.0 | 67 | 500 | R-5 |
| 6 | 0.0 | 400.0 | 1489.0 | 67 | 500 | R-6 |
| 7 | 0.0 | 500.0 | 1491.0 | 67 | 500 | R-7 |
| 8 | 0.0 | 600.0 | 1497.0 | 67 | 500 | R-8 |
| 9 | 100.0 | 0.0 | 1481.0 | 67 | 500 | R-9 |
| 10 | 100.0 | 100.0 | 1479.0 | 67 | 500 | R-10 |
| 11 | 100.0 | 200.0 | 1481.0 | 67 | 500 | R-11 |
| 12 | 100.0 | 300.0 | 1485.0 | 67 | 500 | R-12 |
| 13 | 100.0 | 400.0 | 1488.0 | 67 | 500 | R-13 |
| 14 | 100.0 | 500.0 | 1492.0 | 67 | 500 | R-14 |
| 15 | 100.0 | 600.0 | 1495.0 | 67 | 500 | R-15 |
| 16 | 200.0 | 0.0 | 1478.0 | 67 | 500 | R-16 |
| 17 | 200.0 | 100.0 | 1478.0 | 67 | 500 | R-17 |
| 18 | 200.0 | 200.0 | 1479.0 | 67 | 500 | R-18 |
| 19 | 200.0 | 300.0 | 1481.0 | 67 | 500 | R-19 |
| 20 | 200.0 | 400.0 | 1484.0 | 67 | 500 | R-20 |
| 21 | 200.0 | 500.0 | 1487.0 | 67 | 500 | R-21 |
| 22 | 200.0 | 600.0 | 1491.0 | 67 | 500 | R-22 |
| 23 | 300.0 | 0.0 | 1478.0 | 67 | 500 | R-23 |
| 24 | 300.0 | 100.0 | 1478.0 | 67 | 500 | R-24 |
| 25 | 300.0 | 200.0 | 1478.0 | 67 | 500 | R-25 |
| 26 | 300.0 | 300.0 | 1478.0 | 67 | 500 | R-26 |
| 27 | 300.0 | 400.0 | 1481.0 | 67 | 500 | R-27 |
| 28 | 300.0 | 500.0 | 1483.0 | 67 | 500 | R-28 |
| 29 | 300.0 | 600.0 | 1489.0 | 67 | 500 | R-29 |
| 30 | 400.0 | 0.0 | 1476.0 | 67 | 500 | R-30 |
| 31 | 400.0 | 100.0 | 1476.0 | 67 | 500 | R-31 |
| 32 | 400.0 | 200.0 | 1476.0 | 67 | 500 | R-32 |
| 33 | 400.0 | 300.0 | 1477.0 | 67 | 500 | R-33 |
| 34 | 400.0 | 400.0 | 1478.0 | 67 | 500 | R-34 |
| 35 | 400.0 | 500.0 | 1481.0 | 67 | 500 | R-35 |
| 36 | 500.0 | 0.0 | 1476.0 | 67 | 500 | R-36 |
| 37 | 500.0 | 100.0 | 1476.0 | 67 | 500 | R-37 |
| 38 | 500.0 | 200.0 | 1476.0 | 67 | 500 | R-38 |
| 39 | 600.0 | 0.0 | 1478.0 | 67 | 500 | R-39 |
| 40 | 0.0 | 0.0 | 0.0 | 67 | 500 | R-40 |

DROP-OFF RATES

ALL LANE/RECEIVER PAIRS = 3.0 DBA

K - CONSTANTS

ALL LANE RECEIVER/PAIRS = 0.0 DBA